

**OAKLEY VALLEY WATER COMPANY (MARION DISTRIBUTION)
(PWS 5160031)
SOURCE WATER ASSESSMENT FINAL REPORT**

December 5, 2002



**State of Idaho
Department of Environmental Quality**

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Source Water Assessment for the Oakley Valley Water Company (Marion Distribution), Oakley, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Oakley Valley Water Company (Marion Distribution) drinking water system, PWS 5160031, consists of one ground water well source and two surface water spring sources. The well is located north of Oakley and the springs are located approximately 4 miles west of Oakley on the eastern slope of South Hills (Figure 1). The well was constructed in 1972, is 1004 feet deep, and the water system serves approximately 200 people through 75 connections.

Final susceptibility scores are derived from equally weighing system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential Contaminants/Land Uses are divided into four categories, inorganic contaminants (IOCs, e.g. nitrates, arsenic), volatile organic contaminants (VOCs, e.g. petroleum products), synthetic organic contaminants (SOCs, e.g. pesticides), and microbial contaminants (e.g. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

In terms of overall susceptibility, Adams Well rated moderate for IOCs, VOCs, and SOCs, and automatically high for microbials. Hydrologic sensitivity and system construction scores were both moderate for the well. Land use scores in the well were high for IOCs, VOCs, SOCs, and low for microbials. The automatically high microbial score is due to a detection (October 1998) of total coliform in the well (Table 3).

In terms of overall susceptibility, both Simmons Springs and Bates Springs rated low for IOCs, VOCs, and SOCs, and automatically high for microbials. Both wells had high system construction scores and land use scores were low for IOCs, VOCs, SOCs, and microbials. The automatically high microbial score is due to a detection (October 1998) of total coliform in the springs' manifold.

There are no persistent water chemistry issues affecting the Oakley Valley Water Company (Marion Distribution) sources. In October 1998, total coliform was detected in the well and at the manifold of the two springs. Total coliform was also detected in the distribution system in August 1994.

Disinfection practices include adding calcium hypochlorite tablets consistently to the spring's storage reservoir and to the well's water when necessary. Chloroform, a disinfection byproduct, was detected in the well (April 1993) after a one-time shock chlorination event, but no subsequent detections have occurred. Traces of the IOCs fluoride, chromium, barium, magnesium, mercury, and cadmium, as well as nitrate in concentrations less than 2.8 milligram/liter (mg/l), and arsenic in concentrations less than 6 parts per billion (ppb) have been detected in the water. The maximum contaminant level (MCL) for nitrate set by the Environmental Protection Agency (EPA) is 10 mg/l, and the MCL for arsenic is 10 ppb. Although not a concern at this point, the well and springs exist in a region of high nitrogen fertilizer, high county-wide agricultural chemical use, and high county-wide herbicide use.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the sources are currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the Oakley Valley Water Company (Marion Distribution), drinking water protection activities should first focus on maintaining the requirements of the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). Any spills that occur within the delineated area should be carefully monitored, as should any future development. Practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas should be implemented. No chemicals should be stored or applied within a 50-foot radius of the wellhead or a 100-foot radius of the springs. As most of the designated areas are outside the direct jurisdiction of the Oakley Valley Water Company (Marion Distribution), making partnerships with state and local agencies and industry groups are critical to success of drinking water protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near both urban and residential land use areas. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. As major transportation corridors are located in the delineation, the State Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting), or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Twin Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR OAKLEY VALLEY WATER COMPANY (MARION DISTRIBUTION), OAKLEY, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the rankings of this assessment mean.** Maps showing the delineated source water assessment areas and the inventory of significant potential sources of contamination identified within those areas are attached. The lists of significant potential contaminant source categories and their rankings, used to develop this assessment, are also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the EPA to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of this assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho DEQ recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The Oakley Valley Water Company (Marion Distribution) drinking water system consists of one ground water well source and two surface water spring sources. The well is located north of Oakley and the springs are located approximately 4 miles west of Oakley on the eastern slope of South Hills. The well was constructed in 1972, is 1004 feet deep, and the water system serves approximately 200 people through 75 connections.

There are no persistent water chemistry issues affecting the Oakley Valley Water Company (Marion Distribution) sources. In October 1998, total coliform was detected in the well and at the manifold of the two springs. Total coliform was also detected in the distribution system in August 1994. Disinfection practices include adding calcium hypochlorite tablets consistently to the spring's storage reservoir and to the well's water when necessary. Chloroform, a disinfection byproduct, was detected in the well (April 1993) after a one-time shock chlorination event, but no subsequent detections have occurred. Traces of the IOCs fluoride, chromium, barium, magnesium, mercury, and cadmium, as well as nitrate in concentrations less than 2.8 mg/l, and arsenic in concentrations less than 6 ppb have been detected in the water. The MCL for nitrate set by the EPA is 10 mg/l, and the MCL for arsenic is 10 ppb. Although not a concern at this point, the well and springs exist in a region of high nitrogen fertilizer, high county-wide agricultural chemical use, and high county-wide herbicide use.

Defining the Zones of Contribution – Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer.

The City of Oakley and Oakley Valley Water sources are all located within the Oakley Fan Critical Ground Water Area (CGWA). The northwest trending Foothills Road fault is the approximate western no flow boundary for the Oakley Fan CGWA (Edwards and Young 1984). Pump tests have shown no hydraulic connection between the limestone on the southwest side of the fault and the alluvium, basalt, and rhyolite on the northeast side of the fault (Young and Newton, 1989). The Snake River and the Albion Range represent the northern and southern no flow boundaries, respectively (Crosthwaite, 1969). The northwest trending Churchill Knolls fault to the east interferes with the predominantly north ground water flow direction, shifting the flow to the northwest.

The lithology of the Oakley Fan area consists of undifferentiated pre-tertiary sedimentary rocks, tertiary silicic volcanics, quaternary and tertiary basalt, and quaternary alluvium (Crosthwaite, 1957). These four formations represent the main aquifers in the Oakley Fan area. The immediate area around Oakley is dominated by quaternary alluvium overlying the Idavada Volcanics and a few scattered basalt flows (Crosthwaite, 1969).

The undifferentiated pre-tertiary sedimentary rocks are dominated by limestone and marine deposits and yield large amounts of water. The low hydraulic gradient, lack of altitude control, and wide distribution of wells extracting water from the limestone aquifer prevents accurate contouring of the potentiometric surface. The general movement of groundwater in this confined aquifer is north toward the Foothills Road fault and then northwest (south of the Churchill Knolls fault) and east (north of the Churchill Knolls fault) (Young, 1984). The limestone has a high permeability and a transmissivity ranging from 14,600 ft²/day to 26,000 ft²/day (Edwards and Young, 1984). The tertiary silicic volcanics consist of rhyolite and welded ash flows of the Idavada Volcanics. The confined rhyolite aquifer yields small to moderate amounts of water at a rate of 550 to 1,800 gallons per minute (gpm) from voids, fractures, joints, and weathered zones (Young and Newton, 1989). The Idavada Volcanics in the area have a low permeability and a transmissivity ranging from 2,590 ft²/day to 8,390 ft²/day (Edwards and Young, 1984). The quaternary and tertiary basalts consist of olivine basalt flows of the Snake River Group. This unconfined aquifer yields small to large quantities of water at a rate of 500 to 2,000 gpm from voids, fractures, joints, and weathered zones. The basalt aquifer contains low and high permeability zones with transmissivity ranging from 1,700 to 3,110,000 ft²/day (Edwards and Young, 1984). The quaternary alluvium consists of unconsolidated clay, silt, sand, and gravel. This unconfined aquifer yields small to moderate amounts of water in sand and gravel (Young and Newton, 1989). A perched aquifer, the result of surface water loss and percolation of irrigation water, is also present from Oakley extending north approximately 5 miles (Crosthwaite, 1969).

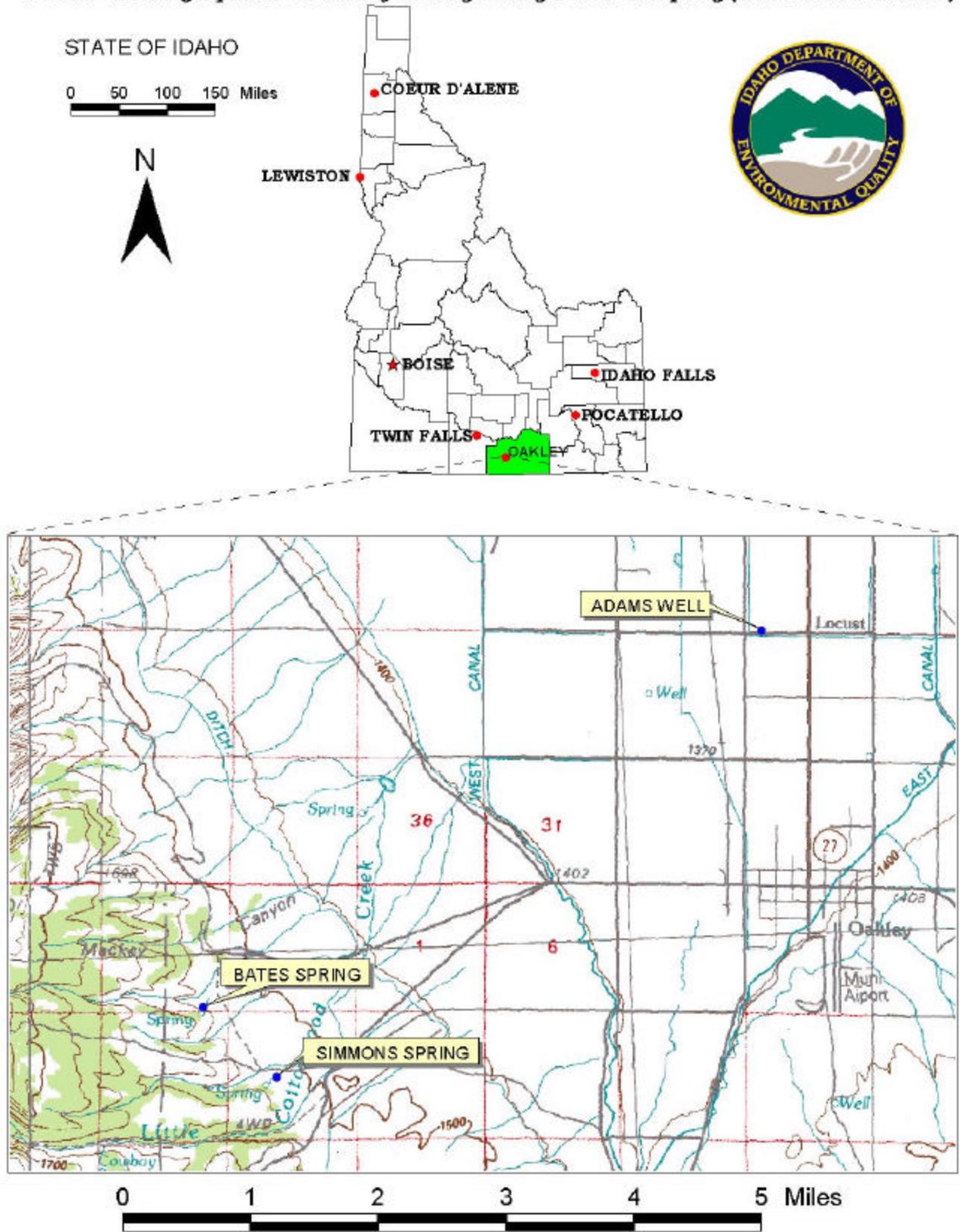
The groundwater flow direction is predominantly to the north (northwest between the faults) in the vicinity of Oakley (Young and Newton, 1989). Much of the surface water in the area is used for agricultural irrigation purposes. Run off in Upper Goose Creek from precipitation is stored in the Goose Creek Reservoir for use in irrigation. Loss from the reservoir results in mounding of the water table in years of relatively high precipitation (Bendixsen, 1994). Water from precipitation on the mountains infiltrates and moves downhill to form seeps and springs or recharge the aquifers (Crosthwaite 1969).

Precipitation on the fan averages 10 inches/yr and 55 inches/yr in the mountains to the south, primarily in the winter (Young and Newton, 1989). Recharge to the aquifers amounts to 2 inches/yr (USGS). Recharge is due to loss from surface water bodies, precipitation, local run off, loss from canals, and percolation of irrigation water (this percolation is observed mainly in the alluvial aquifer in the immediate vicinity of Oakley, not regionally) (Crosthwaite, 1969). The aquifer in the Idavada volcanics is recharged two to four times more rapidly than the limestone aquifer (Edwards and Young, 1984). Observed changes in the water table have averaged 5 ft/yr since 1977 with greatest groundwater elevations observed prior to spring irrigation and the lowest in the summer.

Very little information was available with respect to the springs. No record of their development is available. Consequently, the springs (watersheds) were delineated using the topographic method.

The delineated source water assessment areas for the well can best be described as a south-trending corridor approximately 5 miles long and 1 mile wide (Figure 2), while the springs' delineation is the watershed upgradient of the collection boxes (Figure 3). The actual data used by DEQ in determining the source water assessment delineation area is available from DEQ upon request.

FIGURE 1. Geographic Location of Oakley Valley Water Company (Marion Distribution)



Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ, the Oakley Valley Water Company (Marion Distribution), and from available databases.

The dominant land use surrounding the area of Oakley Valley Water Company (Marion Distribution) is irrigated agriculture for the well and rangeland for the springs.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

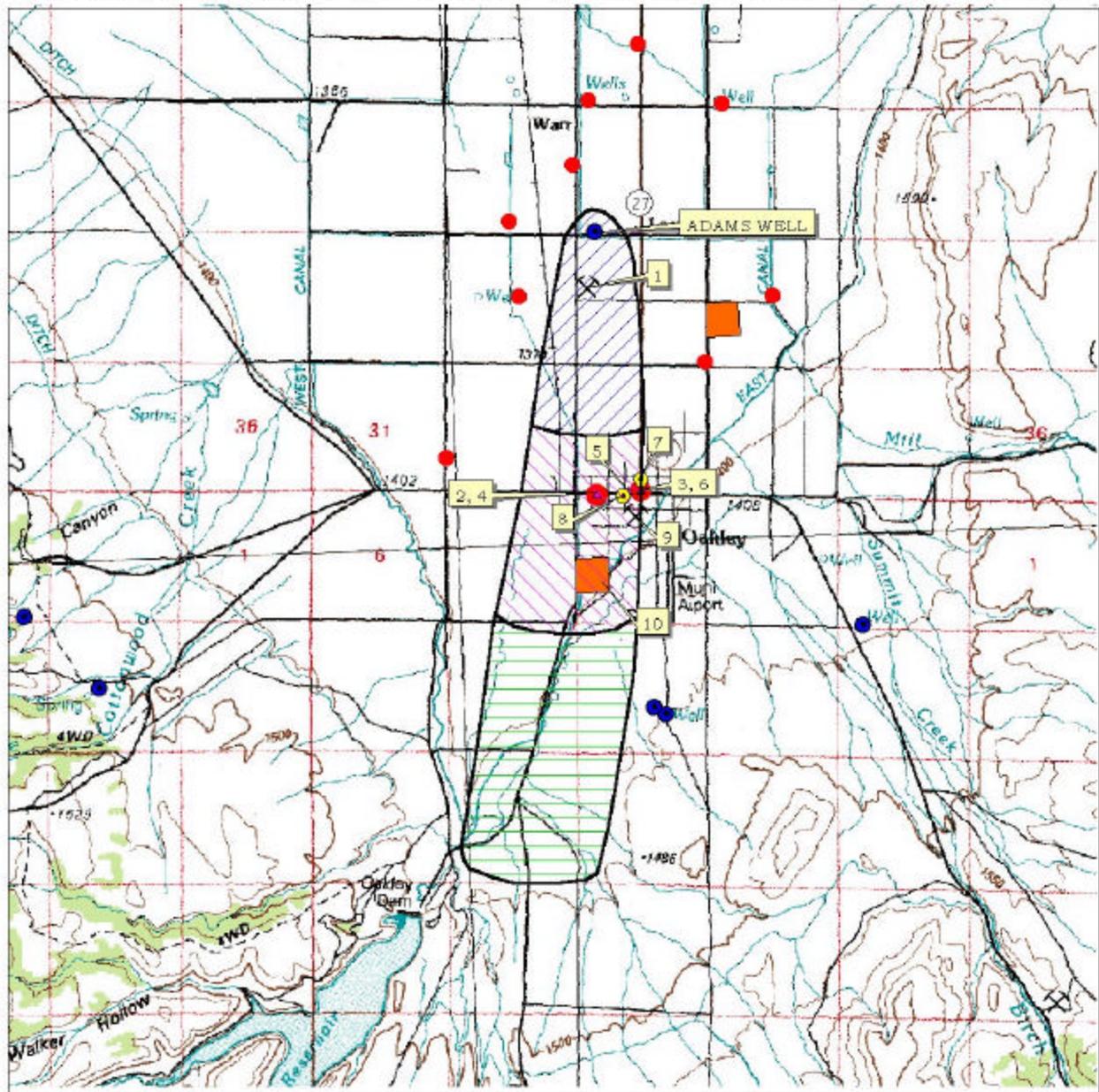
Contaminant Source Inventory Process

A contaminant inventory of the study area was conducted in May and June 2002. This involved identifying and documenting potential contaminant sources within the Oakley Valley Water Company (Marion Distribution) Source Water Assessment Areas through the use of computer databases and Geographic Information System maps developed by DEQ.

The delineation for the Oakley Valley Water Company (Marion Distribution) well has 12 listed potential contaminant sources (Table 1). The GIS map (Figure 2) shows that Highway 27, and Goose Creek and its canal system exist within the delineation. Contaminants could be added to the aquifer in the event of an accidental spill or release associated with these sources. Additionally, underground storage tanks (USTs), leaking underground storage tanks (LUSTs), two quarries, a weed control service, and an auto repair shop are point sources within the delineation which could contribute contaminants to the aquifer if an accident occurred at them.

The delineation for Oakley Valley Water Company (Marion Distribution) springs have one listed potential contaminant source (Table 2, Figure 3). The 1999 Sanitary Survey noted that the required fence around the springs had been rebuilt and there were no present signs that cattle had been inside the fence. It was assumed those cattle used the land outside of that fence and within the springs' delineation. Although Ground Water Under the Direct Influence (GWUDI) evaluation indicated a low risk of surface influence, the potential is there.

Figure 2. Oakley Valley Water Company (Marion Distribution) Delineation Map and Potential Contaminant Source Locations

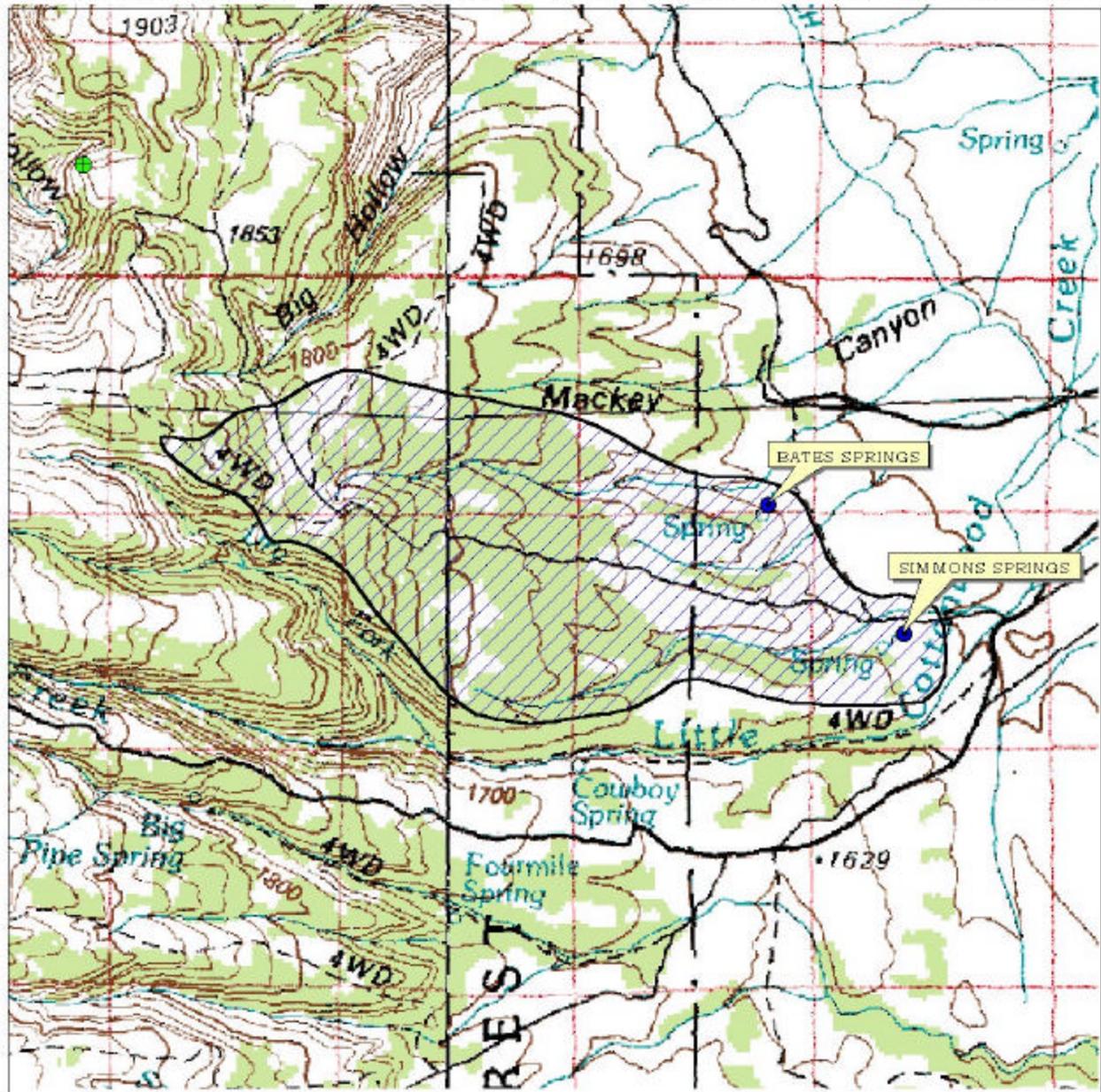


LEGEND		
18 (3 yr TOT)	Dairy	Toxic Release Inventory
3 (6 yr TOT)	LUST Site	SARFATS II Site (EPCRA)
3 (18 yr TOT)	Closed UST Site	Recharge Point
Wellhead	Open UST Site	Injection Well
Enhanced Inventory	Business Molding UST	Group 1 Site
CERCLIS Site	NPDES Site	Coastal Site
RICKIS Site	Mine	Landfill
	AST	Wastewater Land App. Site



**PWS# 5160031
ADAMS WELL**

Figure 3. Oakley Valley Water Company (Marion Distribution) Delineation Map and Potential Contaminant Source Locations



0 0.5 1 1.5 2 Miles

LEGEND		
Time of Travel Zones	★ Dairy	▲ Toxic Release Inventory
1 (0 y TOT)	● LUST Site	● SARA Title II Site (EPCRA)
2 (0 y TOT)	▲ Closed UST Site	● Recharge Point
3 (18 y TOT)	▲ Open UST Site	● Injection Well
● Wellhead	● Business Mailing UST	● Open Pit Site
● Enhanced Inventory	● NPDES Site	● Coastal Site
● CERCLIS Site	⊗ Mine	■ Landfill
● RICKIS Site	● AST	□ Wastewater Land App. Site



PWS# 5160031
BATES SPRINGS
SIMMONS SPRINGS

Table 1. Adams Well, Potential Contaminant Inventory

SITE	Source Description ¹	TOT ² ZONE	Source of Information	Potential Contaminants ³
1	Clay mine	0-3 YR	Database Search	IOC, VOC, SOC
2, 4	UST site, LUST site, site cleanup completed; impact unknown	3-6 YR	Database Search	VOC, SOC
3, 6	UST site, LUST site, site cleanup completed; impact unknown	3-6 YR	Database Search	VOC, SOC
5	UST site, gas station, open	3-6 YR	Database Search	IOC, VOC, SOC
7	Auto repair and service	3-6 YR	Database Search	IOC, VOC, SOC
8	Weed control service	3-6 YR	Database Search	IOC, SOC
9	Stone quarry	3-6 YR	Database Search	IOC, VOC, SOC
10	Landfill	3-6 YR	Database Search	IOC, VOC, SOC
	Highway 27	0-10 YR	GIS Map	IOC, VOC, SOC, microbial
	Goose Creek and its canal system	0-10 YR	GIS Map	IOC, VOC, SOC, microbial

² TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

³ IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 2. Bates Springs and Simmons Springs, Potential Contaminant Inventory

SITE	Source Description ¹	TOT ² ZONE	Source of Information	Potential Contaminants ³
	Cattle grazing	0-3 YR	1999 Sanitary Survey	IOC, SOC, microbial

² TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead

³ IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analyses

The well and springs' susceptibility to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Well Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitar) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

The hydrologic sensitivity was moderate for the well. This rating reflects the poorly to moderately drained nature of the soils of the region, which would retard the downward movement of contaminants. Also positively affecting the score was the presence of an aquitar above the producing zone of the well. The score was increased because although the vadose zone is composed of topsoil, clay, and gravel, but it is unknown if the composition was predominantly clay or the more permeable gravels. The score was also increased because the water table was less than 300 feet (43 feet) (Table 3).

System Construction

Spring Construction

Spring construction directly affects the ability of the intake to protect the aquifer from contaminants. The Idaho Administrative Code for Public Drinking Water Systems (IDAPA 58.01.08.550.04) states that springs which supply water for a public water system served by one or more springs shall ensure that the following requirements are met:

- a. Springs shall be housed in a permanent structure and protected from contamination including the entry of surface water, animals, and dust;
- b. A sample tap shall be provided;
- c. A flow meter or other flow measuring device shall be provided; and
- d. The entire area within one hundred (100) feet of the spring shall be owned by the supplier of water or controlled by a long term lease, fenced to prevent trespass of livestock and void of buildings, dwellings and sources of contamination. Surface water and drainage ditches shall be diverted from this area.

With regard to this report, spring construction was evaluated by answering two questions: 1. Is the intake structure of the spring located and constructed to drinking water standards (IDAPA 58.01.08.550.04); 2. Is the water collected in such a manner that it is not exposed to any surface related contaminants before it enters the distribution system?

Both the Bates Springs and Simmons Springs rated highly susceptible for system construction (Table 4). Renovation of the infiltration galleries, collection boxes, and piping of both springs was due to begin in the fall of 1999. No data was available regarding the work's completion so this report assumed the conservative stance of non-completion. Although the sanitary survey noted the water system was in "substantial compliance" with regulations, because improvements were planned, it is assumed that neither spring meets current standards completely.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in Sanitary Surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

Adams Well rated moderate for system construction (Table 3). The well is not in a 100 year floodplain, and based on the May 2000 sanitary survey, it is protected from surface flooding. Also resulting in favorable ratings is the fact that the wellhead and surface seal are maintained, and the well's water derives from more than 100 feet below the current water table. The scores were adversely affected because it is unknown if the perforated sections of casing and the annular seal extend into low permeability units.

The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all Public Water Systems (PWSs) to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the requirements include casing thickness, well tests, and depth and formation type that the surface seal must be installed into. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Ten-inch diameter wells require a casing thickness of 0.365 inches Eight-inch diameter wells require a casing thickness of at least 0.322. Well tests are required at the design pumping rate for 24 hours or until stabilized drawdown has continued for at least six hours when pumping at 1.5 times the design pumping rate. A point was added to the well's score because casing thicknesses do not meet current construction standards. Though the well may have met standards at the time of construction, current construction standards are stricter.

Potential Contaminant Source and Land Use

The Adams Well rated high for IOCs (e.g. arsenic, nitrate), VOCs (e.g. petroleum products), SOCs (e.g. pesticides), and low for microbial contaminants (e.g. bacteria). The transportation corridors, Goose Creek, and its canals, which intersect the delineation, contributed to the rating, as well as the UST and LUST point sources, the landfill, quarries, weed control service, and auto repair station. In addition, due to its volume in the delineation, agricultural land was counted as a source for IOCs.

Simmons Spring and Bates Springs both rated low for IOCs, VOCs, SOCs, and microbial contaminants (Table 4). There are no potential contaminant sources within the delineation. The high county wide agricultural chemical use was counted as a source, as was the free-range cattle.

Final Susceptibility Rating

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well, despite the land use of the area, because a pathway for contamination already exists. Additionally, the storage or application of any potential contaminants within 50 feet of the wellhead will automatically lead to a high score. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time-of-travel zone (Zone 1B) and much agricultural land use contribute greatly to the overall ranking. In terms of total susceptibility, the Oakley Valley Water Company (Marion Distribution) wells have moderate susceptibility to the IOC, VOC, SOC, and microbial potential contaminants.

Table 3. Summary of the Oakley Valley Water Company (Marion Distribution) Susceptibility Evaluation

Source	Susceptibility Scores ¹									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Adams Well	M	H	H	H	L	M	M	M	M	H*

¹H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

H* = automatic high rating due to October 1998 detection of total coliform in the well.

Table 4. Summary of Oakley Valley Water Company (Marion Distribution) Susceptibility Evaluation

Drinking Water Sources	Susceptibility Scores ¹									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Simmons Springs	L	L	L	L	L	M	L	L	L	H*
Bates Springs	L	L	L	L	L	H	L	L	L	H*

¹H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

H* = automatic high rating due to October 1998 detection of total coliform at the springs' manifold.

Susceptibility Summary

The Oakley Valley Water Company (Marion Distribution) drinking water system consists of one ground water well source and two surface water spring sources. The well is located north of Oakley and the springs are located approximately 4 miles west of Oakley on the eastern slope of South Hills. The well was constructed in 1972, is 1004 feet deep, and the water system serves approximately 200 people through 75 connections.

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In terms of overall susceptibility, both Simmons Springs and Bates Springs rated low for IOCs, VOCs, and SOCs, and automatically high for microbials. Both wells had high system construction scores and land use scores were low for IOCs, VOCs, SOCs, and microbials. The automatically high microbial score is due to a detection (October 1998) of total coliform in the springs' manifold.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For the Oakley Valley Water Company (Marion Distribution), drinking water protection activities should first focus on maintaining the requirements of the sanitary survey. Any spills from potential contaminant sources should be carefully monitored, as should any future development in the delineated areas. Although not a problem at this time, practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas should be implemented. No chemicals should be stored or applied within the 50-foot radius of the wellhead or 100 foot radius of the springs. Most of the designated areas are outside the direct jurisdiction of Oakley Valley Water Company (Marion Distribution), making partnerships with state and local agencies and industry groups critical to success of drinking water protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near urban and residential land uses areas. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the U.S. Environmental Protection Agency. There are major transportation corridors that cross the delineations, therefore, the State Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Twin Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

Assistance

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Twin Falls Regional DEQ Office (208) 736-2190

State DEQ Office (208) 373-0502

Website: <http://www.deq.state.id.us>

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, mlharper@idahoruralwater.com, Idaho Rural Water Association, at 1-208-343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

**POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS**

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as ASuperfund, is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

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Appendix A

Oakley Valley Water Company (Marion Distribution) Susceptibility Analysis Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

WELL:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- ≥ 13 High Susceptibility

SPRINGS

1. VOC/SOC/IOC/microbial Final Score = System Construction + Potential Contaminant/Land Use

Final Susceptibility Scoring:

- 0 - 6 Low Susceptibility
- 7 - 12 Moderate Susceptibility
- ≥ 13 High Susceptibility

1. System Construction		SCORE			
Drill Date	11/01/1971				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	1999			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	YES	0			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		3			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	YES	0			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	YES	0			
Total Hydrologic Score		2			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	YES	NO	NO	NO	YES
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	3	3	3	2
(Score = # Sources X 2) 8 Points Maximum		6	6	6	4
Sources of Class II or III leacheable contaminants or	YES	2	2	2	
4 Points Maximum		2	2	2	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B Greater Than 50% Irrigated Agricultural Land		4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		12	12	12	8
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II Greater Than 50% Irrigated Agricultural Land		2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		2	2	2	0
Cumulative Potential Contaminant / Land Use Score		23	21	23	10
4. Final Susceptibility Source Score		10	9	10	9
5. Final Well Ranking		Moderate	Moderate	Moderate	High

1. System Construction

SCORE

Intake structure properly constructed	NO	1
Infiltration gallery or well under the direct influence of Surface Water	NO	0

Total System Construction Score 3

2. Potential Contaminant Source / Land Use

IOC Score VOC Score SOC Score Microbial Score

Predominant land use type (land use or cover)	BASALT FLOW, UNDEVELOPED, OTHER	0	0	0	0
Farm chemical use high	YES	2	0	2	
Significant contaminant sources *	YES				
Sources of class II or III contaminants or microbials present within the 500' of the intake and the		1	0	1	1
Agricultural lands within 500 feet	NO	0	0	0	0
Three or more contaminant sources	NO	0	0	0	0
Sources of turbidity in the watershed	NO	0	0	0	0

Cattle use area surrounding spring. Total Coliform detected at springs' manifold (10/98).

Total Potential Contaminant Source / Land Use Score 4 0 4 2

3. Final Susceptibility Source Score

7 3 7 5

4. Final Source Ranking

Low Low Low High

* Special consideration due to significant contaminant sources
Source is considered High Susceptibility

1. System Construction

SCORE

Intake structure properly constructed	NO	1
Infiltration gallery or well under the direct influence of Surface Water	NO	0

Total System Construction Score 3

2. Potential Contaminant Source / Land Use

IOC Score VOC Score SOC Score Microbial Score

Predominant land use type (land use or cover)	BASALT FLOW, UNDEVELOPED, OTHER	0	0	0	0
Farm chemical use high	YES	2	0	2	
Significant contaminant sources *	YES	Cattle use the area surrounding the spring. Total Coliform detected in springs' manifold (10/98).			
Sources of class II or III contaminants or microbials present within the 500' of the intake and the Agricultural lands within 500 feet	NO	1	0	1	1
Three or more contaminant sources	NO	0	0	0	0
Sources of turbidity in the watershed	NO	0	0	0	0

Total Potential Contaminant Source / Land Use Score 4 0 4 2

3. Final Susceptibility Source Score

7 3 7 5

4. Final Source Ranking

Low Low Low High

* Special consideration due to significant contaminant sources
 Source is considered High Susceptibility